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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/076,882	02/14/2002	Michael Guttman	11613.50USU1	1282
46037	7590	12/13/2010		
OTT-NIH C/O EDWARDS ANGELL PALMER & DODGE LLP PO BOX 55874 BOSTON, MA 02205			EXAMINER MEHTA, PARIKHA SOLANKI	
			ART UNIT 3737	PAPER NUMBER
			MAIL DATE 12/13/2010	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/076,882	<b>Applicant(s)</b> GUTTMAN ET AL.	
	<b>Examiner</b> PARIKHA S. MEHTA	<b>Art Unit</b> 3737	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 30 September 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1,3-13 and 15-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-13 and 15-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Continued Examination Under 37 CFR 1.114*

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 29 July 2009 has been entered.

### *Claim Objections*

2. Claims 3-13, 15-18 are objected to because of the following informalities:

Claims 3, 5, 7, 10, 13, 17 and 18 recite dependence from claim 2, which is no longer pending. For the purposes of further examination herein, the claims will be treated as depending from claim 1. Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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3. Claims 1-3, 5, 7-13 and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boernert et al (US Patent No. 6,317,619 B1), hereinafter Boernert ('619), of record, in view of Haishi et al (Development of a Real-Time 3D NMR Imaging System. 7<sup>th</sup> Annual Meeting of the International Society for Magnetic Resonance in Medicine. May 1999), hereinafter Haishi (1999).

**Regarding claims 1, 3, 7 and 19**, Boernert ('619) teaches an apparatus (Fig. 2) and method (Fig. 4) for real-time 3D MR image reconstruction, including means and steps for collecting MR image data, transferring the data to a computer, producing and displaying a volume rendering from the MR data in real time with respect to the act of collecting the MR data (Fig. 4). Boernert ('619) collects, transfers and renders the volume data continuously from a plurality of two-dimensional image slices (col. 16 lines 5-8). Boernert ('619) does not expressly teach production of a three-dimensional rendering of a volume in real time. In the same field of endeavor, Haishi (1999) teaches an apparatus and method for real-time reconstruction of a 3D MR image, with respect to the collection of the MR data (Introduction, Hardware and Software, Fig. 3). It would have been obvious to one of ordinary skill in the art to have modified Boernert ('619) to include the real-time 3D rendering steps and elements of Haishi (1999) and thereby yield the claimed invention, in order to produce a more detailed and accurate representation of the imaged volume.

**Regarding claims 5 and 10**, the complete dataset of Boernert ('619) (Fig. 54 step 56) constitutes a rectilinear slab as claimed.

**Regarding claims 11 and 12**, Boernert ('619) completes the 3D rendering after data for the entire slab has been reconstructed (Fig. 4 step 57).

**Regarding claim 13**, the real-time rendering of Haishi (1999) constitutes performing the rendering wherein delay of between collecting the MR data and displaying the 3D volume rendering is equal to or less than about one third of a second as claimed.

**Regarding claim 17**, the displaying of a partial view of Boernert ('619) (Fig. 4) constitutes determining the position of a cut plane through the volume and displays image data on only one side of the cut plane as claimed.

**Regarding claim 18**, Boernert ('619) organizes the MR data into image planes orthogonal to the view of the volume rendering displayed on the monitor (col. 15 line 57-col. 16 line 1).

4. Claims 4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boernert ('619) and Haishi (1999) as applied to claim 1, further in view of NessAiver (US Patent No. 5,329,925), hereinafter NessAiver ('925), of record.

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Boernert ('619) and Haishi (1999) do not teach steps for view sharing between even and odd echoes as claimed. In the same field of endeavor of magnetic resonance imaging, NessAiver ('925) teaches that it is known in the art to perform view sharing between even and odd echoes in order to combat DC artifacts (col. 2 lines 24-32). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Boernert ('619) and Haishi (1999) to perform view sharing between even and odd echoes, in view of the teachings of NessAiver ('925).

5. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Boernert ('619) and Haishi (1999) as applied to claim 1, further in view of Pfister (Architectures for real-time volume rendering, *Future Generation Computer Systems*, 15:pp. 1-9, 1999), of record, hereinafter Pfister (1999).

Boernert ('619) and Haishi (1999) do not expressly address the display frame rate nor steps for alpha blending. In the same field of endeavor, Pfister (1999) teaches steps for alpha blending (p. 3 col. 2) and also teaches that it is known in the art to provide real-time frame rates of approximately 10-30 fps (p. 2 col. 1), which constitutes a rate of "about 10 or more frames per second" as claimed. Accordingly, it would have been obvious to one of ordinary skill in the art at the time of invention to perform the rendering method of Boernert ('619) and Haishi (1999) by displaying the volume at 10-30 fps, and to employ state of the art alpha blending methods, as the combination of known prior art elements or steps to yield predictable results has previously been held as unpatentable over the prior art (*KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385).

6. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boernert ('619) and Haishi (1999) as applied to claim 13, further in view of Deering (US Patent No. 6,417,861), hereinafter Deering ('861), of record.

Boernert ('619) and Haishi (1999) do not expressly discuss displaying the volume rendering by alpha blending and/or maximum intensity projection (MIP) techniques. In the same field of endeavor of computer graphics, Deering ('861) teaches that alpha blending is known in the art to be advantageous for increasing the realism of computer images (col. 2 lines 25-28). Deering ('861) also teaches steps for MIP mapping (col. 29 lines 32-56), and teaches that MIP mapping is also advantageous for improving the realism of reconstructed images (col. 28 lines 38-43). Accordingly, it would have been obvious to one of ordinary skill in the art at the time of invention to have modified Boernert ('619) and Haishi (1999) to employ the alpha blending and MIP techniques taught by Deering ('861) to render the 3D images, in view of the teachings of Deering ('861).

*Response to Arguments*

3. Applicant's arguments filed 29 July 2009 have been fully considered but they are not persuasive.

Regarding Applicant's argument that Boernert does not disclose displaying the rendering at "about 10 frames per second" with "low latency" (Remarks p. 8), Examiner notes that both terms are relative and highly subjective. Although the reference does not explicitly discuss the frame rate or latency, both features are inherent to the reference image display, and since "about" and "low" are so subjective, such inherent features are interpreted to meet the claim.

Regarding Applicant's argument that Haishi does not teach real time volume rendering (Remarks p. 8), Applicant later admits that Haishi does in fact teach such real time rendering (Remarks p. 9), and as such the allegation that the reference fails to meet the claim is not persuasive.

Regarding Applicant's allegation that Boernert and Haishi are improperly combined (Remarks p. 8), Examiner notes that both references are directed towards the same field of endeavor of MR image processing, and as such the combination of their teachings is proper.

Regarding Applicant's suggestion that the prior art does not meet the present claims because the references do not discuss whether the combined resulting image would be useful (Remarks p. 8), such argument is nothing more than a statement of opinion unsubstantiated by factual evidence to prove the combination would not function, and does not sufficiently prove the teachings of the references are not combinable.

Regarding Applicant's argument that Deering teaches away from the claimed invention by not teaching real-time data acquisition, Examiner notes that the reference is not relied upon as teaching such feature, and the teachings of Deering cited in the rejection can be properly combined with the other references regardless of whether Deering renders in real time or otherwise. Since Deering is directed towards the same problem solving area of improving image processing, the reference is properly combined with Boernert and Haishi.

As Applicant's arguments are wholly unpersuasive for at least the foregoing reasons, the previous rejection of all pending claims in view of the prior art is maintained and reiterated herein.

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*Conclusion*

4. All claims are drawn to the same invention claimed in the application prior to the entry of the submission under 37 CFR 1.114 and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the application prior to entry under 37 CFR 1.114. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action after the filing of a request for continued examination and the submission under 37 CFR 1.114. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PARIKHA S. MEHTA whose telephone number is (571)272-3248. The examiner can normally be reached on M-F, 8 - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Casler can be reached on 571.272.4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/BRIAN CASLER/

Supervisory Patent Examiner, Art Unit

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/Parikha S Mehta/  
Examiner, Art Unit 3737